

USER'S MANUAL FOR



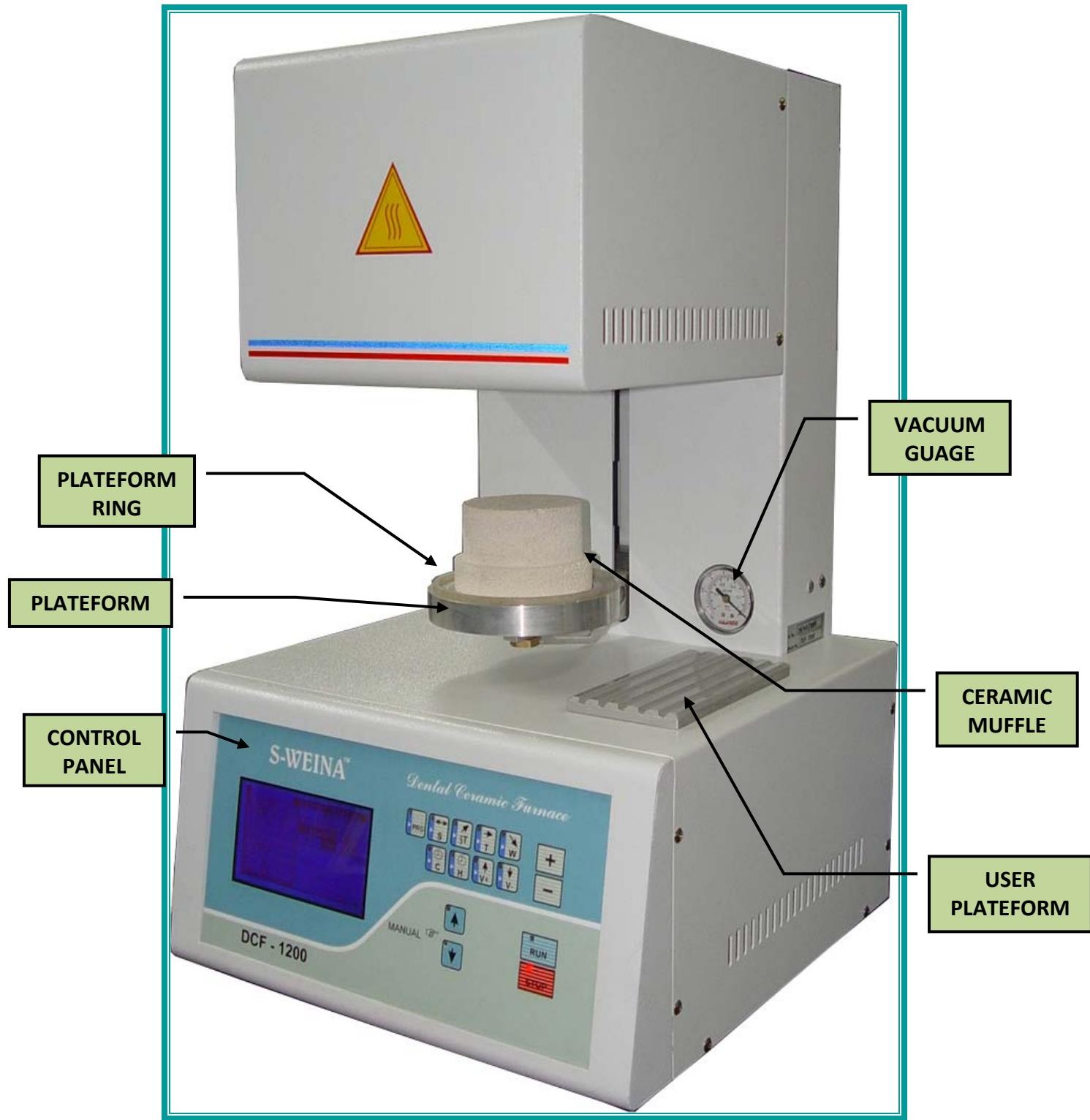
DENTAL CERAMIC FURNACE
DCF-1200

Index

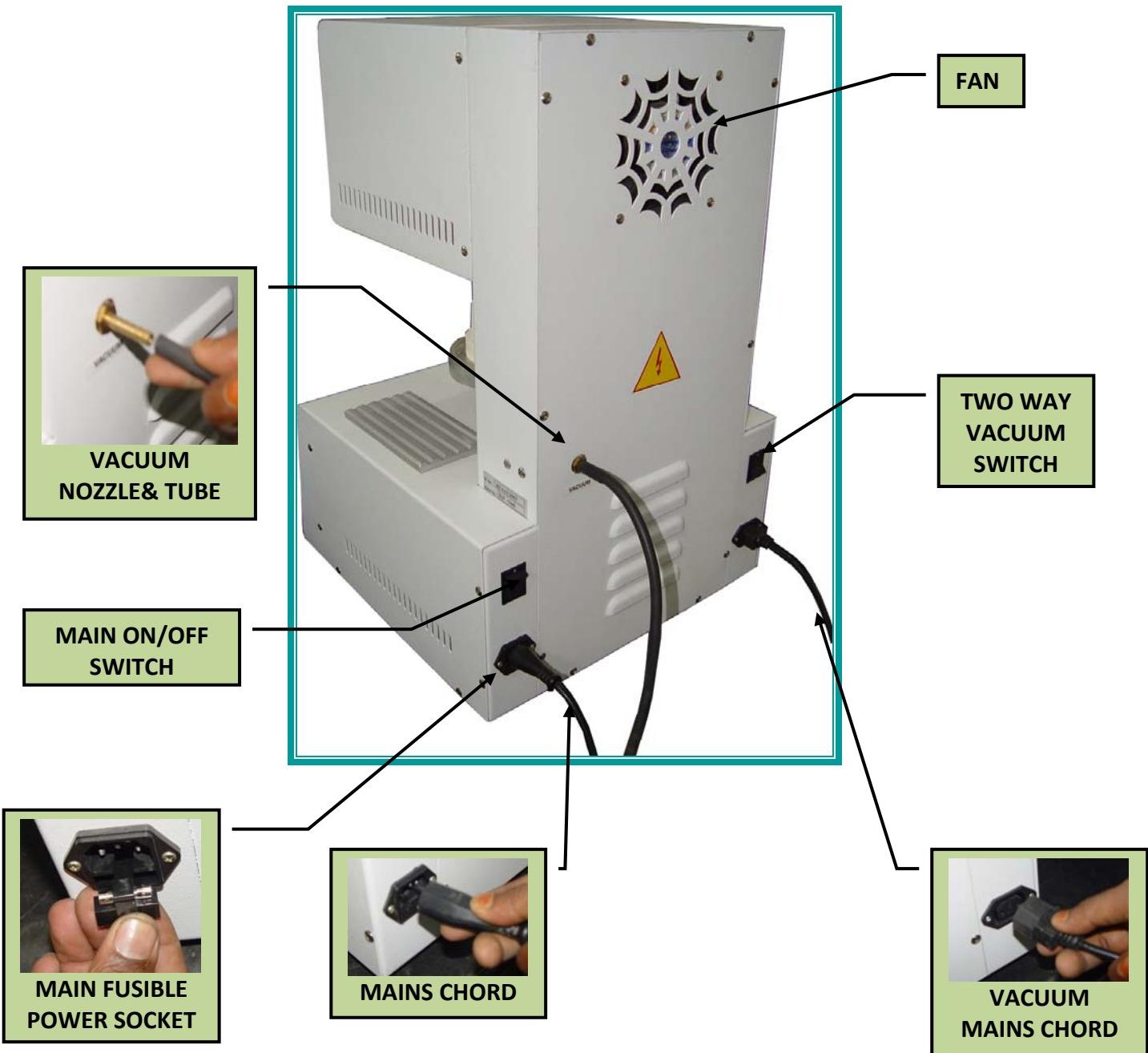
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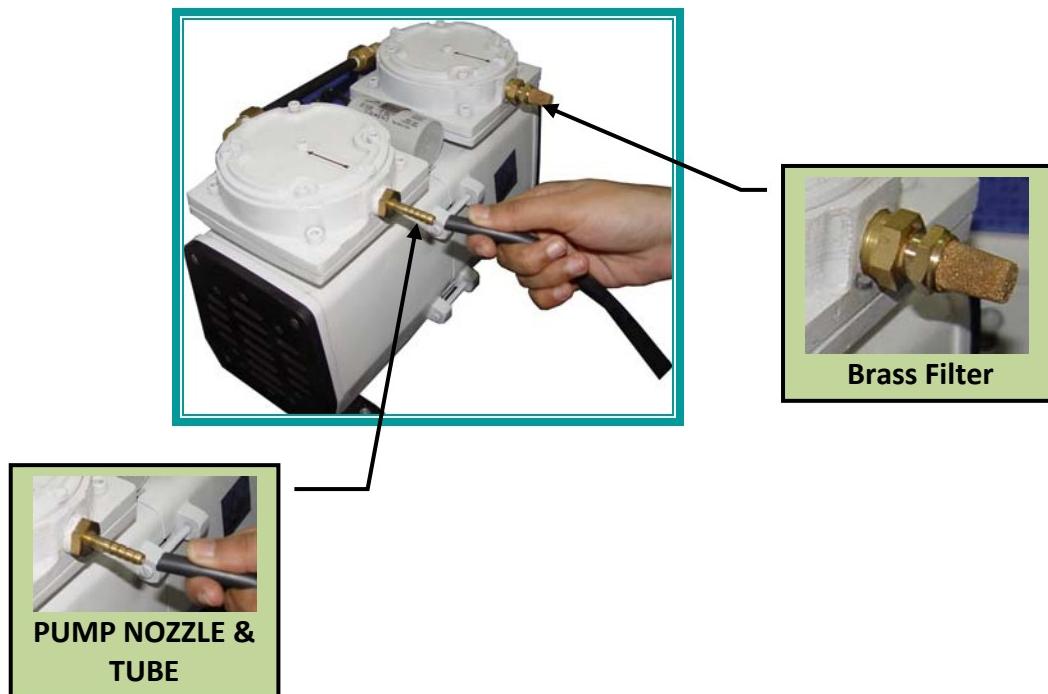
FRONT VIEW OF THE MACHIINE



BACK VIEW OF THE MACHINE



BACK VIEW OF THE PUMP



Technical Specification:

Electrical : 230V AC, 7 Ampere

Power Consumption : 1600 Watt

Maximum Temp. : 1200°C

Heating Element : Infrared

Thermocouple : K Type, MI

Dimension : 580mm Height x 380mm Length x 390mm Width

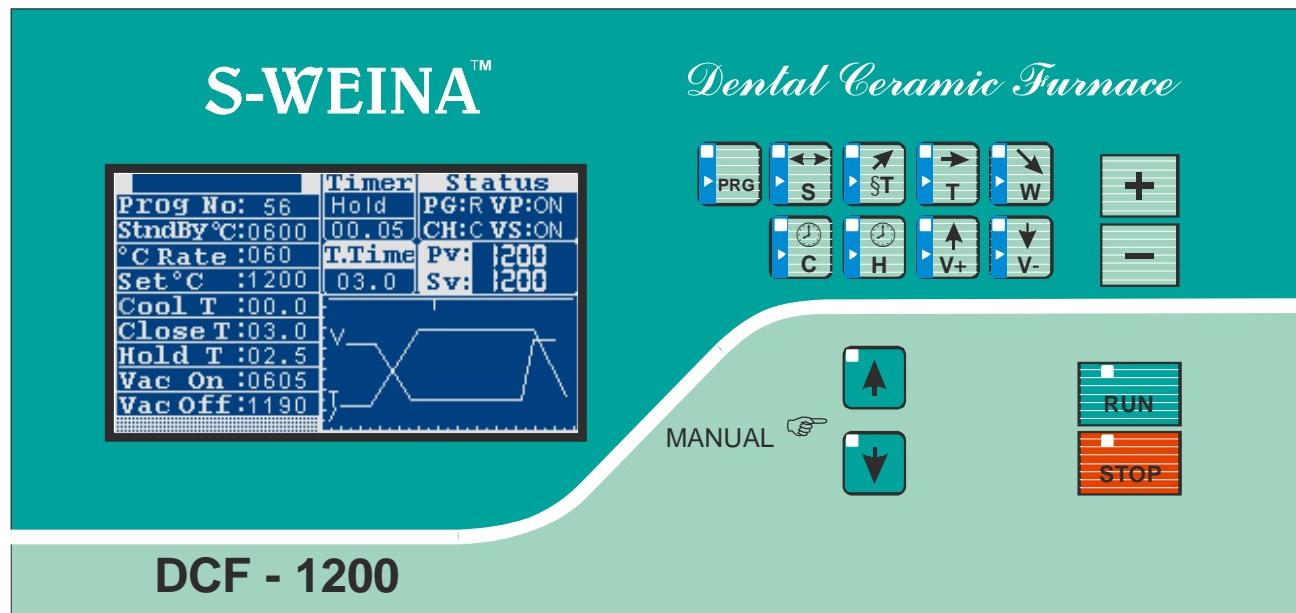
Part Detail :

- 1) Platform Ring: - Platform Ring act as a seal between platform & Heating Zone. It should be well fitted & should not be damaged. In case if it is damage, replace it with the new one.
- 2) Platform: It is a round, up-down moving platform, on which ceramic muffle is to be situated.
- 3) Control Panel: - It is a panel which controls all the parameters of machine. Parameters can be set & view on the panel.
- 4) Vacuum Gauge: - It shows Vacuum level in the Heating Zone.
- 5) Ceramic Muffle: - It is used to place required Job on it & then firing is done. It provides safeguard to the Platform. Do not start any program without placing Ceramic Muffle on Platform because firing heat can damage it.
- 6) User Platform: - It is a fixed platform which user can utilize for Job related work.
- 7) Fan: - It will start working, on connecting Mains Chord to the Power irrespective of ON/OFF mode of the machine. It works as a cooling system which keeps Machine Body cool.
- 8) Vacuum Nozzle & Tube; - Connect Vacuum Nozzle with Vacuum Pipe & this pipe in turn will be connected to the vacuum pump.
- 9) Main On/Off switch: - This is the only switch which gives power to the machine. This switch should be ON first to go ahead.
- 10) Main fusible power socket:- This is the socket to connect mains chord wire. It has two fuses, operating & extra. When operating fuse fails use extra fuse as an operating fuse as shown in the picture.
- 11) Mains Chord: - Connect this wire to the Main fusible socket power socket & to the power supply.
- 12) Vacuum mains chord:- This chord is connected with Vacuum Pump, connect it to the socket provided on the rear panel of the machine.
- 13) Two Way Vacuum switch:- This switch can be used for manual test of vacuum pump, When machine is on RUN mode it automatically starts Vacuum Pump-No need to start this switch.
- 14) Pump Nozzle & Tube: - Connect Pump Nozzle with Tube & this Tube in turn will be connected to the machine.
- 15) Brass Filter: - Filter prevents dust. This reduces noise level generated from the Vacuum Pump.

BASIC TERMS AND ITS EXPLANATION:

<u>Term</u>	<u>Explanation</u>	<u>Display</u>	<u>Keyboard</u>
PROGRAM	<ul style="list-style-type: none"> - There are total 99 programs, which can be set. - 1 to 50 programmes are fixed, which cannot be changed. - 51 to 99 programs are User defined ,means parameters of these programs can be set by the user depending upon the requirement. 	Prog No : 47	
STAND-BY TEMP	<ul style="list-style-type: none"> - This is the temperature supported in chamber after it has been closed but no programme has been started. 	StndBY °C : 0600	
RATE @ MINUTE TEMP.RISE	<ul style="list-style-type: none"> - Speed of temperature increase per minute. - Valid at the time of programme performance. 	°C Rate : 120	
FIRING TEMP	<ul style="list-style-type: none"> - This is the maximum temperature in the chamber which is held constant for the time assigned in Hold Time. - Minimum Temp: 30°C & Maximum Temp: 140°C 	Set °C : 0970	
COOLING TIME	<ul style="list-style-type: none"> - This is the time in minutes to open the chamber of the machine. It is divided into two equal parts relevant to two fixed levels of the working table. 	Cool T : 00.0	
CHAMBER CLOSE TIME	<ul style="list-style-type: none"> - This is the time in minutes to close the chamber of the machine. 	Close T : 03.0	
HOLD TIME	<ul style="list-style-type: none"> - The time in minutes for which the furnace maintains Firing Temperature &/or Vacuum, & remains close after finishing the programme. 	Hold T : 01.0	
VACUUM ON	<ul style="list-style-type: none"> - Development of Vacuum (Vacuum Pump starts at this temperature) 	Vac On : 0600	
VACUUM OFF	<ul style="list-style-type: none"> - Release of Vacuum (Vacuum Pump Stops at this temperature) 	Vac Off : 0969	

PANEL DETAIL:

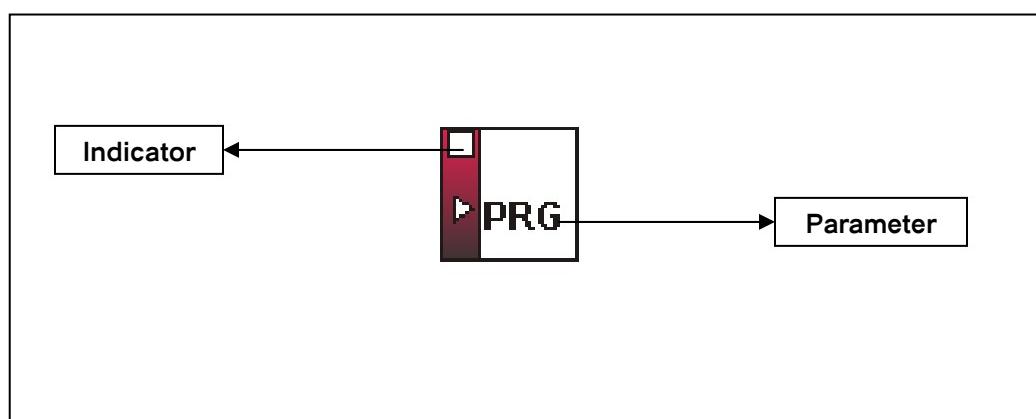


Panel is divided into two segments, which are as follows:

- ❖ Keyboard
- ❖ Display

KEYBOARD

Keyboard consists of 15 Buttons. All the parameters of the programme can be set by using buttons which are provided on the Keyboard.



	Puts the number of the program which is to be performed into assign mode.
	Puts stand-by temperature for the current selected program into assign mode.
	Puts temperature increase per minute for the current selected program into assign mode.
	Puts maximum temperature for the current selected program into the assign mode.
	Puts time delay for free cooling of the chamber before opening into assign mode.
	Puts time for closing the chamber into assign mode.
	Puts time for holding the Firing Temperature &/or Vacuum into assign mode.
	Temperature of switching the vacuum ON.
	Temperature of switching the vacuum OFF.
	Using this button can increase Parameters of the program.
	Using this button can decrease Parameters of the program.
	Closes furnace in manual mode. It takes approximately 17 seconds to close the furnace in manual mode.
	Opens furnace in manual mode. It takes approximately 17 seconds to open the furnace in manual mode.
	Starts the program for performance. The program starts only at a completely opened chamber.
	Program can be stopped at any stage by using this button.

HOW TO SET A PARAMETER ????

Following the table parameter can be set in User Defined Program with maximum value & minimum value detail.

KEY	TERM	Maximum Temperature	Minimum Temperature
	PROGRAMME	99	01
	STAND-BY	1200	0200
	RATE @ MINUTE TEMP.RISE	150	001
	FIRING TEMPERATURE	1200	0200
	COOLING TIME	25.0	00.0
	CHAMBER CLOSE TIME	25.0	00.0
	HOLD TIME	25.0	0.5
	VACUUM ON	1200*	0000*
	VACUUM OFF	1200**	0000**

*This should equal to or more than stand by temperature.

** This should be less than Firing Temp & more than Vacuum On.

To change any of the above parameter of chosen program it is necessary to do the following:

- ① Press the button of required parameter for change (The corresponding to this parameter indicator lights on keyboard & parameter will be highlighted on display).
- ② Change the chosen parameter to necessary value by buttons [+] & [-]. The first ten digits are performed slowly & after that the change continuous by quick speed.
- ③ Press the button of the parameter to store edited value (The parameter Indicator lights off).

VACUUM PARAMETER

VACUUM ON:

Temperature at which vacuum pump started.

The moment at which vacuum starts can be chosen in two criteria

** Depending on chamber temperature. Range from 0 300 OC to programmed in parameter T value

** Depending on the stage of the program performance

If V+ =0000 – there is no vacuuming in this program

If V+ =0001 – vacuum pump starts immediately after the chamber has been closed.

Notice: Temperature for vacuuming start must be programmed to be

Bigger than the start temperature (parameter "s")

VACUUM OFF:

Temperature at which vacuum is released. The moment at which

Vacuum is released can be chosen in two criteria.

** Depending on chamber temperature range from 0300 0c to Programmed parameter T value. If V - = 0000 vacuum is released when temperature reaches T Releasing the vacuum in firing zone.

The time for releasing H at reaching the firing temperature T is Divided into ten equal parts.

If V- = 0001 program is performed as the process is in vacuum for time 1/10 (10%) from the firing time H and 9/10- without Vacuum.

By analogy:

If V - = 0002 vacuum firing is done during 20% of firing time H

If V - = 0003 vacuum firing is done during 30% of firing time H

If V - = 0004 vacuum firing is done during 40% of firing time H

If V - = 0005 vacuum firing is done during 50% of firing time H

If V - = 0006 vacuum firing is done during 60% of firing time H

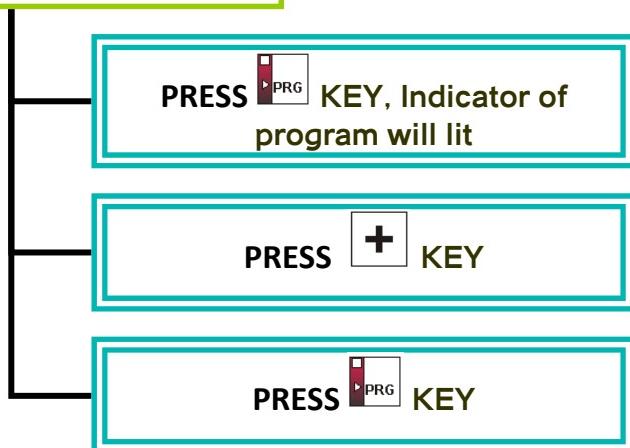
If V - = 0007 vacuum firing is done during 70% of firing time H

If V - = 0008 vacuum firing is done during 80% of firing time H

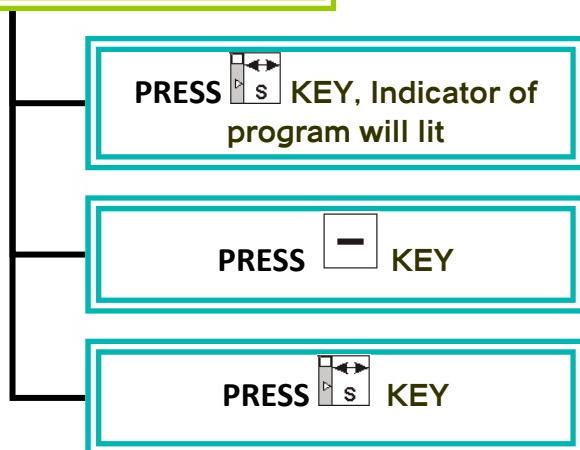
If V - = 0009 vacuum firing is done during 90% of firing time H

If V - = 0010 vacuum is released after firing time H runs out.

**TO SELECT PROGRAM NO : 25
FROM PROGRAM NO : 26**



**TO SELECT STAND BY TEMP: 500
FROM CURRENT TEMP : 600**



**TO SELECT RATE OF RISE TEMP: 80
FROM CURRENT TEMP : 50**

PRESS  KEY, Indicator of program will lit

PRESS  KEY

PRESS  KEY

**TO SELECT FIRING TEMP: 900
FROM CURRENT TEMP : 950**

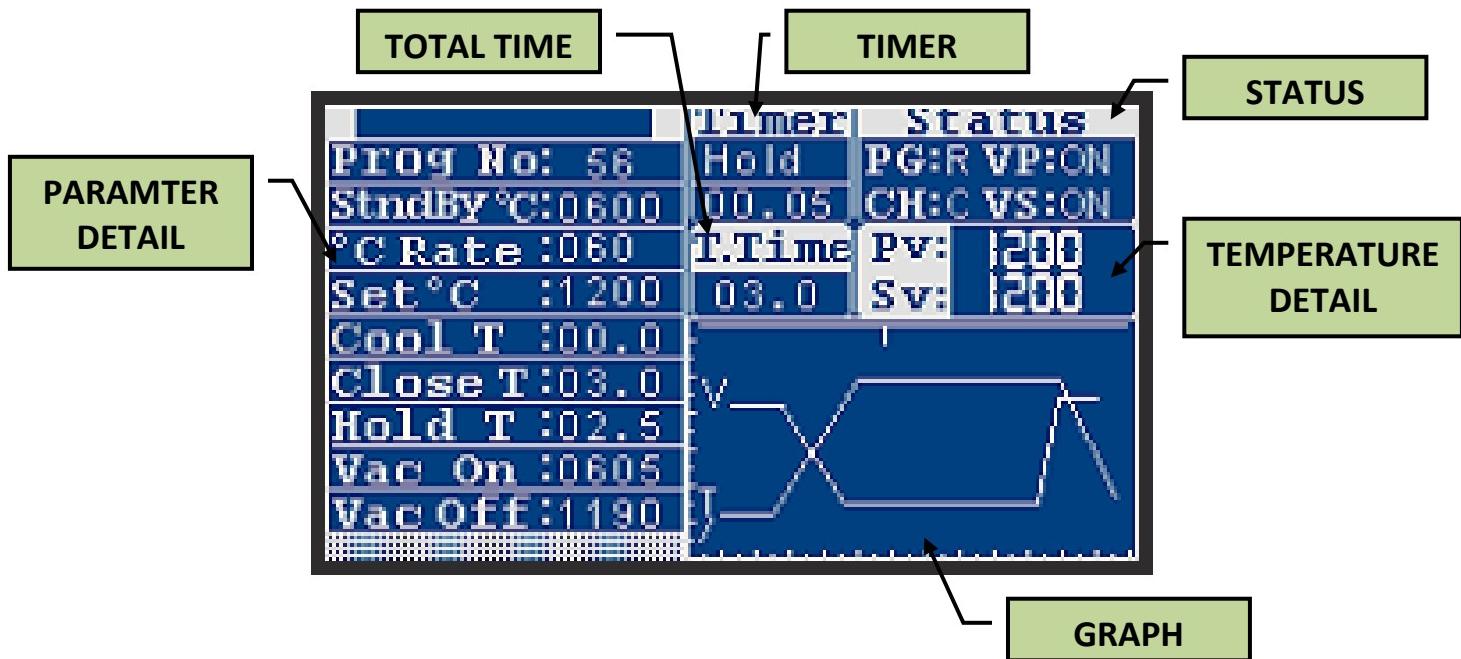
PRESS  KEY, Indicator of program will lit

PRESS  KEY

PRESS  KEY

DISPLAY DETAIL :

It's a graphical LCD display having blue backlit & gray character.



Parameter Detail: This gives complete detail about the program & respective parameter.

Total Time: This is the total time in minutes.

Timer: It has two parameters, one is time & other is program status (Open, Hold, Close). In case machine is on RUN mode, at the time of chamber close it will show as Close and in time row it will show time. For E.G. Close time is 01.00, timer will divide this one minute in four fraction, of 0.25 each. So after 25% of minute it will show as 0.25 i.e 15 second,

Time (In % of Minute)	Display	Time (In Second)
25%	0.25	15
50%	0.50	30
75%	0.75	45
100%	1.00	60

Status: Status shows condition of four different task which are as follows:

PG:R : PG stands for Program. If program is on RUN mode it will show R (Stands for RUN) or else it will show S (Stands for STOP).

VP:ON : VP stands for Vacuum Pump.

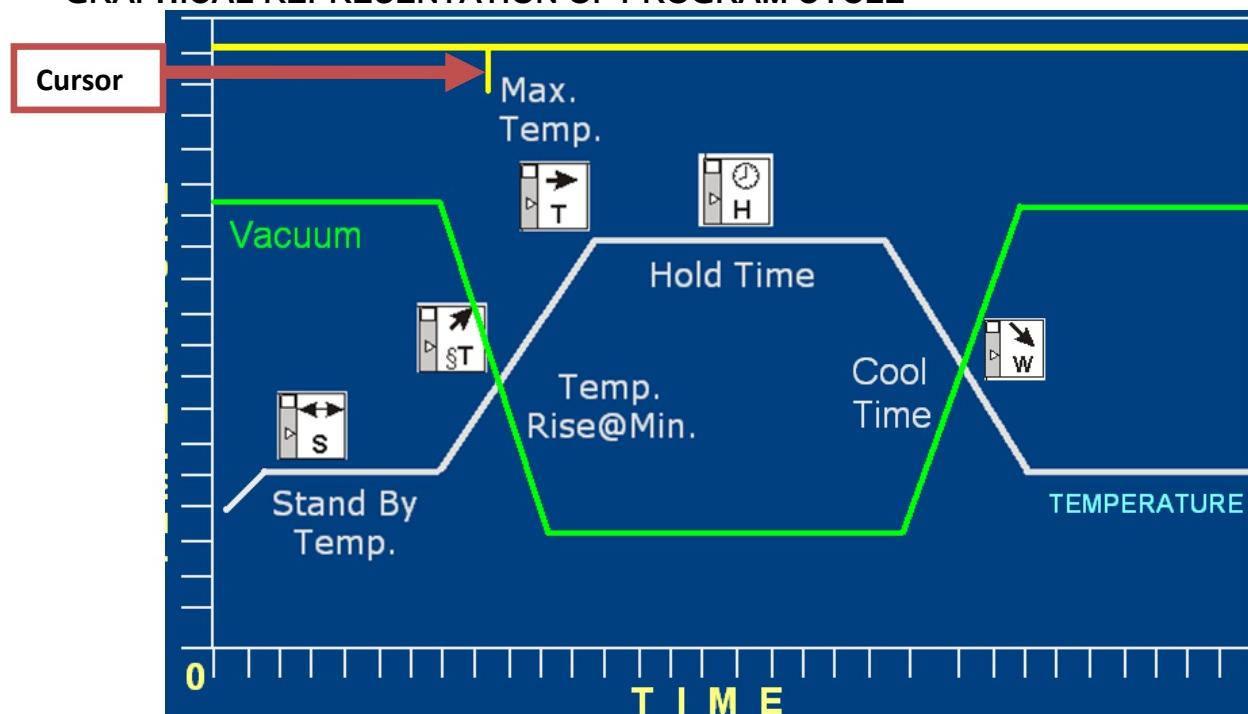
When Vacuum Pump is ON, it will show ON, but when it is OFF it will show as OFF.

VS:ON : VS stands for Vacuum Solenoid.

When Vacuum Solenoid is ON, it will show ON, but when it is OFF it will show as OFF.

CH:O : CH stands for Chamber. If chamber is Open it will show as "O"(O Stands for Open), when it is close it will show as "C" (C stands for Close)

GRAPHICAL REPRESENTATION OF PROGRAM CYCLE



Online graphical representation of each program cycle can be viewed on the provided graph of Display. It gives brief information about the selected program with all important parameters like Temperature, Vacuum & Time. It is an online graph, cursor moves according to time, temperature & vacuum parameter.

ERROR LIST & ITS EXPLANATION:

Error no: 01 : V- ≥ Firing Temperature

Vacuum Off should be less than Firing Temperature.

EXAMPLE : 1)

REASON : Vacuum Off is 0970 , which is equal to Firing Temperature i.e. 0970

SOLUTION: Make Vacuum off 0969 or less

72	0600	55	0970	01.00	02.00	03.00	0700	0970

EXAMPLE : 2)

REASON : Vacuum Off is 0970 , which is equal to Firing Temperature i.e. 0971

SOLUTION : Make Vacuum Off 0969 or less

72	0600	55	0970	01.00	02.00	03.00	0700	0971

Error no: 02 : V+ >= V- (Vacuum On >= Vacuum Off)

Vacuum Off should be greater than Vacuum On

EXAMPLE : 1)

REASON : Vacuum Off is 0699 , which is less than Vacuum On i.e.0700

SOLUTION : Make Vacuum Off 0701 or more

51	0600	55	0970	01.00	02.00	03.00	0700	0699

EXAMPLE : 2)

REASON : Vacuum Off is 0700 , which is equal to Vacuum On i.e.0700

SOLUTION : Make Vacuum Off 0701 or more

51	0600	55	0970	01.00	02.00	03.00	0700	0700

Error no: 03 : V+ <= S (Vacuum On <= Stand by Temperature)

Vacuum On should be equal to or more than Stand by Temperature

EXAMPLE : 1)

REASON : Vacuum on is 0599, which is less than Stand by Temperature

SOLUTION : Make Vacuum On 0600 or more

51	0600	55	0970	01.00	02.00	03.00	0599	0850

EXAMPLE : 2)

REASON : Vacuum on is 0550, which is less than Stand by Temperature

SOLUTION : Make Vacuum On 0600 or more

51	0600	55	0970	01.00	02.00	03.00	0550	0850

Error no: 04 : Firing Temperature < Present Value

When RUN key is pressed even if Present Value is more than Firing Temperature of next required program cycle, Error no: 04 will be displayed, & continue buzzer will start.

Present Cycle									
	51	0600	55	0970	01.00	02.00	03.00	0600	0850
Next Required Cycle									
	90	0400	55	0650	01.00	02.00	03.00	0410	0649

Solution : Wait till PV comes to any value which is $\pm 20^{\circ}\text{C}$ of stand by temperature of next required cycle. & press RUN key.

Error no: 05 : Limit switch activated simultaneously

Sensor for lower/upper position of the actuator is not reached in manual and automatic opening/Closing mode. Probable reason: damage in limit switch or in actuator mechanism. Please call manufacturer.

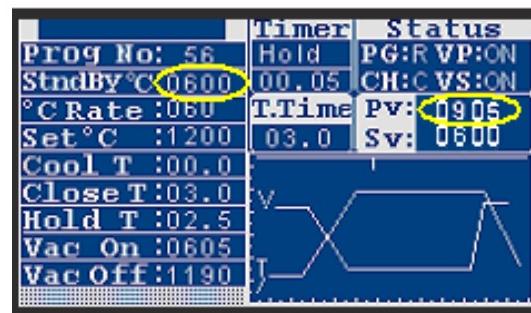
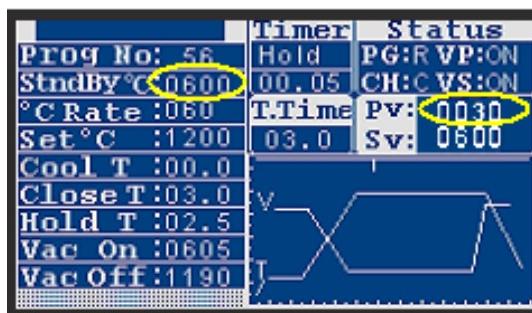
Error no: 06 : Middle position switch fail

Sensor for Middle position switch of the actuator is not reached in manual and automatic opening/closing mode. Probable reason: damage in middle position switch or in actuator mechanism. Please call manufacturer.

Error no: 10 : PV >± 20°C OF S (Present Value >± 20°C Of Stand by Temperature)

Program can not run unless & until PV will come to any value which is between ± 20°C of stand by temperature.

In the above case User do not have to do anything but to wait. Machine will accept RUN command even if PV is not equal to any value between ± 20°C of stand by temperature. RUN command will start blinking & Error will be disappear, which indicates RUN command is accepted, but the machine will start performing once the PV becomes any value between ± 20°C of stand by temperature.



Error no: 11 : PV >± 100°C OF SV (Present Value >± 100°C Of Set Value)

If there is a difference of 100° C between Present Value (PV) & Set Value (SV), then machine will show Error no:11.

Possible reason for this error can be:

- 1) Failure of Sensor
- 2) Problem in Controller
- 3) Failure of Heating Element



Error no: 12 : Vacuum on less than Minimum Value

Programmer starts counting vacuum in the tank with Vacuum On time for 1 minute, & during in this 1 minute time if Vacuum level is not adequate (equal to or more than Minimum vacuum set value) it will show Error no:12.

Solution: Please check following points:

1.	Connection of Vacuum Nozzle & Tube	
2.	Connection of Pump Nozzle & Tube	
3.	Check connection of Vacuum Mains Chord	
4.	Manual test of Vacuum Pump	See Instruction given on Page .6 (13) Under Two Way Vacuum switch

Error no: 21 : No Access – PROGRAM in run mode

This error will appear by pressing any parameter in Run Mode.

REASON : PROGRME is on RUN mode.

SOLUTION : Press STOP Key to change.

PROGRAM TABLE:

SERVICE PRG 1									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
1	100	0	0	0	0	0	0	0	Night
2	403	140	980	0	1	1	0	0	Oxydate
3	403	40	780	0	2	2	1	720	Demo
4	403	90	1040	0	0.5	5	1	1	Purge
5	403	90	1000	0	1	5	1	1	Degassing1

SERVICE PRG 2									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
6	403	60	955	0	1	1	0	0	Test 1
7	403	90	980	0	1	25.5	0	0	Vacuuming
8	403	140	900	0	0.5	1	715	5	Test 2
9	403	90	1150	0	0.5	0.5	0	0	Auto Agtst
10	403	140	900	0	0.5	1	715	5	Test 3

VITA OMEGA									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
11	600	115	950	0	1	1	600	949	OPAQUE 1
12	600	110	930	0	2	1	600	929	OPAQUE 2
13	600	55	925	0	6	1	600	924	DENTIN 1
14	600	55	920	0	5	1	600	919	DENTIN 2
15	600	110	930	0	3	1	0	0	GLASE

FLEXO CERAM									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
16	500	50	960	0	1	1	500	959	OPAQUE 1
17	500	50	950	0	4	1	500	949	OPAQUE 2
18	500	50	930	0	6	1	500	929	DENTIN 1
19	500	50	925	0	4	1	500	924	DENTIN 2
20	500	50	920	0	3	1.5	0	0	GLASE

CREATION									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
21	600	80	980	0	1	0.5	600	979	OPAQUE 1
22	600	80	950	0	3	1	600	949	OPAQUE 2
23	600	60	925	0	6	1	600	924	DENTIN 1
24	600	60	915	0	5	1	600	914	DENTIN 2
25	600	60	930	0	2	1	0	0	GLASE

SHOFU VINTAGE									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
26	700	45	980	0	3	1	700	979	OPAQUE 1
27	700	45	970	0	4	1	700	969	OPAQUE 2
28	700	45	965	0	8	1	700	964	DENTIN 1
29	700	45	955	0	6	1	700	954	DENTIN 2
30	700	45	955	0	5	0.5	0	0	GLASE

CERAMCO II									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
31	650	65	950	0	3	0.5	650	949	OPAQUE 1
32	650	65	930	0	3	0.5	650	929	OPAQUE 2
33	620	70	920	0	7	0.5	620	900	DENTIN 1
34	620	70	910	0	5	0.5	620	900	DENTIN 2
35	620	80	920	0	3	1	0	0	GLASE

IVOCLAR									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
36	550	80	980	0	2	1	550	979	OPAQUE 1
37	550	80	970	0	2	1	550	969	OPAQUE 2
38	550	60	920	0	6	1	550	919	DENTIN 1
39	550	60	910	0	5	1	550	909	DENTIN 2
40	550	60	920	0	4	1	0	0	GLASE

DUCERAM									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
41	620	120	990	0	1	0.5	620	989	OPAQUE 1
42	620	75	930	0	3	1	620	929	OPAQUE 2
43	620	75	920	0	9	1	620	919	DENTIN 1
44	620	75	910	0	5	1	620	909	DENTIN 2
45	620	75	910	0	3	1	0	0	GLASE

BIODENT									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
46	650	139	980	0	1	0.5	620	979	OPAQUE 1
47	600	120	970	0	3	1	620	969	OPAQUE 2
48	600	65	940	0	6	1	620	939	DENTIN 1
49	600	65	930	0	5	1	620	929	DENTIN 2
50	600	100	940	0	3	1	0	0	GLASE

USER PRG 01									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
51									OPAQUE 1
52									OPAQUE 2
53									DENTIN 1
54									DENTIN 2
55									GLASE

USER PRG 02									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
56									OPAQUE 1
57									OPAQUE 2
58									DENTIN 1
59									DENTIN 2
60									GLASE

USER PRG 03									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
61									OPAQUE 1
62									OPAQUE 2
63									DENTIN 1
64									DENTIN 2
65									GLASE

USER PRG 04									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
66									OPAQUE 1
67									OPAQUE 2
68									DENTIN 1
69									DENTIN 2
70									GLASE

USER PRG 05									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
71									OPAQUE 1
72									OPAQUE 2
73									DENTIN 1
74									DENTIN 2
75									GLASE

USER PRG 06									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
76									OPAQUE 1
77									OPAQUE 2
78									DENTIN 1
79									DENTIN 2
80									GLASE

USER PRG 07									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
81									OPAQUE 1
82									OPAQUE 2
83									DENTIN 1
84									DENTIN 2
85									GLASE

USER PRG 08									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
86									OPAQUE 1
87									OPAQUE 2
88									DENTIN 1
89									DENTIN 2
90									GLASE

USER PRG 09									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
91									OPAQUE 1
92									OPAQUE 2
93									DENTIN 1
94									DENTIN 2
95									GLASE

USER PRG 10									
PRG	S	§ T	T	W	C	H	V +	V -	NAME
96									OPAQUE 1
97									OPAQUE 2
98									DENTIN 1
99									DENTIN 2

WIRING DIAGRAM DENTAL CERAMIC FURNACE DCF-1200:

